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# Sustainable and Efficient Exam Management: Implementing ERP Systems in Higher Education Institutions

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**ABSTRACT:** This research paper explores the development and implementation of an ERP system tailored for VJTI, with a comprehensive examination of its key modules. These include Admin, Student, Faculty, and Exam Department. The admin module gives full authority to manage system functions that include students' enrolment, courses, and sessions. The student module provides students with an option to update their details, register for courses, and complete feedback forms. The faculty module also works for grade control and submission tools as well. The Exam Department module consolidates all the exam activities, including the upload of students' data, the generation of roll numbers, course registration, and the generation of reports for exams. The focus of this paper is on the manner in which these modules are created and how their integration into the system improves the performance and user contentment in the total package of the ERP system solutions. This is supported by end-user surveys and qualitative data suggesting that the system plays a crucial role in enhancing administration and academies.

**KEYWORDS:** ERP System, Exam Management, Administrative Control, Student Registration, Faculty Interface, Exam Department Automation, PDF Report Generation, VJTI, System Development, User Feedback

## I. INTRODUCTION

In the modern world, effective management of academic work is central to ensuring the proper functioning of higher learning institutions. Of these tasks, the management of examinations can be said to be one of the most important. A manual, paper-based system is therefore seen as inefficient and environmentally unsustainable due to the following weaknesses: To meet these challenges, a number of institutions are seeking technological solutions.

The purpose of this research paper is to present and describe a new system that will be used to manage examinations without the use of paper, which has been integrated into our college's ERP system. The aim is to improve the existing examination systems to eliminate existing issues and incorporate technology to improve their functionalities. While our current ERP system is adequate in its ability to perform basic functions, it is plagued by several major issues. These are things like relying too much on paperwork, slow processing, and a high risk of making mistakes. Such issues not only hinder the accomplishment of tasks by administrative personnel but also affect students and faculties. The proposed enhanced system aims at addressing these problems through some of its features, like automatic scheduling of examinations, the generation of quiz banks, the submission of exams online and grading, as well as data analytics in real time.

Therefore, the first strategy we employed was to critically analyze the existing ERP system to establish its strengths and weaknesses and design effective remedial measures in light of benchmark best practices in educational technology. In the current paper, the systematic development of the improved examination management module is discussed based on system design, implementation plan, user satisfaction, and the result of the improvement. Through the integration of such technologies, we hope to enhance the efficiency, accuracy, and user-friendliness of the examination management process for all VJTI stakeholders.

## II. LITERATURE SURVEY

. EXAMINATION MANAGEMENT SYSTEM is a software that assist in easy and efficient management of college examinations. Through the automation of this tasks, it becomes easier to handle many exams at the same time; a feat that would have taken a lot of time but for the reduction of mistakes as well. This integration also helps to lead the burden of administration and lessen the possibility of human error, which makes the exam process more accurate.

However, the system provides current information and analysis that can enhance on the resources and other decisions to be made in the near future. It provides more security features for the sensitive data and has user friendly interfaces for the appropriate staffs such as administrator, student etc. In addition, the appropriate use of automation promotes enhancing the results of the exam and making the process clearer. Muhammad Saiful Islam and colleagues (2015) studied the challenges of introducing ERP systems in higher education at the British Academy of Management conference. They found that obstacles like high costs, staff resistance to change, and the complexity of integrating ERPs with existing educational processes are prevalent. Despite these challenges, the study highlights ERP systems' potential benefits: improved data management, enhanced administrative efficiency, and better resource allocation. Muhammad Saiful Islam and his team (2015) studied the challenges and difficulties of introducing ERP systems in colleges. They found challenges like high cost, resistance from staff, and the difficulty of integrating ERPs with existing processes. Regardless these issues, their study highlights ERP systems have their own benefits which are better data management, improved administrative efficiency, and better use of resources.

Mohamed Abdel-Basset (2021) conducted a survey on ERP systems in colleges, which discusses current trends and practices. It shows the importance of careful planning and involving all stakeholders for successful implementation. The survey points out benefits like better decision-making through real-time data analysis, streamlined administrative tasks, and improved communication between departments. However, technical challenges and the need for extensive training can make implementation difficult.

Sagar Pawar (2015) looks at how ERP systems are used in colleges, focusing on tasks like student registration and exam scheduling. The study highlights the need for user-friendly interfaces and strong support systems to help faculty and students use the system effectively. ERP systems can be used for reducing mistakes and save plenty of time.

Ayodele Adebiyi and Olufemi Awodele (2017) discuss how ERP systems enhance efficiency in education. They highlight ERP's ability to improve coordination between departments and seamlessly integrate educational processes. They also note that current/ ongoing maintenance and updates are essential to keep up with technological and educational changes.

Parth Goel & his team (2023) implemented a project for their own college in which they covered the development of an ERP system. Using information from their work, we can learn how automating exam management with ERP can have a positive impact and value added to it. They learned that through ERP implementation, accuracy and turnover time of information to students and faculties has been enhanced thus enhancing overall education.

### **III. SYSTEM DESIGN**

To undertake efficient exam management at VJTI the use of a better ERP system required certain course of action.

1. Requirement Gathering and Analysis: This was the first step in setting up the new exam management system

- By having group interviews with the faculty administrative staff and students we got to know their needs and problems with the current system. This included surveys, interviews, and group discussions.
- We carefully analyzed this information to find common problems, desired features, and possible improvements. This analysis helped us design the new system.

2. System design: With a clear understanding of the requirements, we designed the system architecture. During this phase, we concentrated on the development of a sound, standardized, and responsive environment that can support all the exam management operations.

The key points of design of application were the integrity of the data, integration with other modules of ERP, and scalability.

3. Database design: Post system design, we need to design a database to hold all the data collected. After consultations, we came up with an elaborate database policy to cater for all aspects of the exam management process.

This concerned data of the students, data of the faculties, data of all the staffs, information related to exams, details of the courses created, schedules, the distribution of teachers and courses, and student reports.

4. User-Friendly UI Design: The User Interface (UI) is how the exam department, students, faculty, admin, and the other staff will work with the system.

As the system had to be used by the general population, ease of use and accessibility of the UI became the paramount focus for us

5. Testing: After setting up the system it is equally important to conduct tests after implementing the system in order to ascertain whether it is functioning optimally and to fix any problems that might arise. It involves unit testing, integration testing, system testing as well as user acceptance testing. All the problems that might arise should be handled before the system is being deployed.

#### IV. MODULES

The system has several important modules:

1. Admin: The admin module has access over all the main tasks: Create, Read, Update, and Delete (CRUD). Admin is allowed to manage everything in the system, like adding or removing students, creating and handling courses, allocating faculty to courses, and creating schemes and sessions.

EXAMINATION		
Course time slots		
Exam schemes		
Excel files		
Feedbacks		
Grade cutoffs		
Mark entries		
Questions		
Seating arrangements		
Student course registrations		
Students		
Time_slot_creations		
Timetables		

Site administration

ACADEMICS		
Academic activitys		
Academic calendars		
Academic course creations		
Branchs		
Calendar activitiess		
Degrees		
Elective groupss		
Schemes		
Sessions		
Teacher course allocations		

Figure 2: Academics Admin Screen

Figure 1. Examination Admin Screen

#### 2. Student:

The following are available for the student:

- Update their personal information, such as mobile number, email ID, and current address.
- Register for current semester courses and retake courses they failed in the previous semester.
- Provide feedback on faculty and campus facilities.
- Download their admit cards for exams.

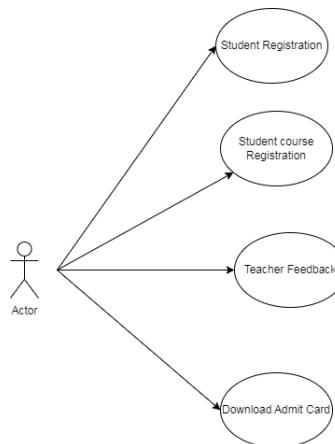


Figure 3: Student Use Case

**3. Faculty:**

Faculty Module Functionalities:

- Faculty login
- Mark Entry
- Mark lock & submit
- Grade Adjustment
- Mark Unlock (if required)
- Logout

**4. Exam Department:** The exam department module is designed to manage all exam-related activities, such as:

- Student data upload
- Roll number generation (for students in first year and direct second year only)
- Student session allocation
- Exam course creation
- Exam course registration
- Course related reports
- Tabulation reports
- Seating arrangement allocation/ de-allocation
- Timeslot and Timetable Generation
- Faculty and facility Feedback Question creation

## **V. RESULTS**

**1. Student Section Results**

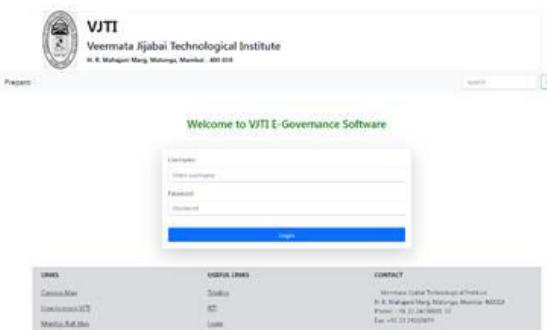


Figure 4: Student Login Page

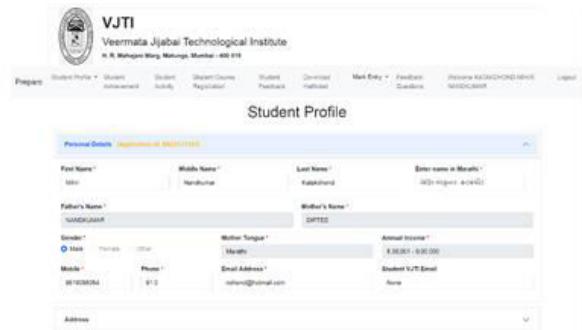


Figure 5: Student Profile Page

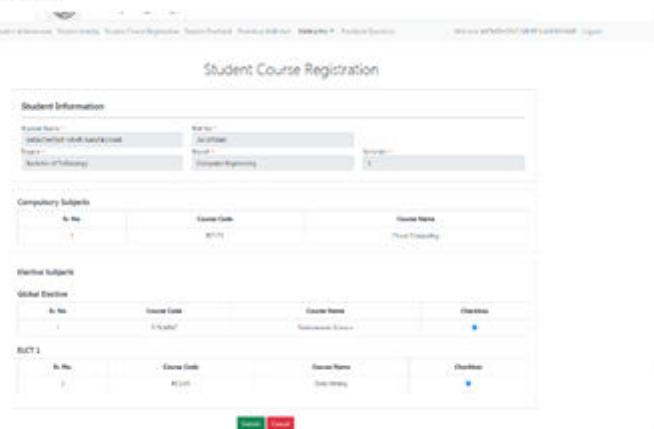


Figure 6: Student Course Registration

## 2. Examination Section Results



Figure 7: Landing Page

Figure 8: Student Data Upload: Provide Excel sheet having information of all students got admission

Figure 9: Roll No. Generation: Custom roll no on basis of admission year, branch code, gender and count

Figure 10: Exam Course Creation

Figure 11: Exam Course Registration: It is course registration window for students to allow course registration

## Exam Slot Generation

Exam Type <input type="button" value="Choose Exam"/>	Slot Name ex. 03:15 PM_to_04:45	Exam From: <input type="button" value="Start Time"/>	Exam to: <input type="button" value="End Time"/>
<input type="button" value="Submit"/>			

## Existing Slots

Exam Type	Slot Name	Start Time	End Time	Action
MST	3:15 - 5:15 pm	3:15 p.m.	5:15 p.m.	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
MST	10:00 - 12:00 PM	10 a.m.	noon	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
ESE	10:00 - 1:00 PM	10 a.m.	1 p.m.	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
MST	Morning slot	10:15 a.m.	11:30 a.m.	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Figure 12: Exam Slot Generation

## Time Table Generation

Session <input type="button" value="odd 2023-24"/>	Degree <input type="button" value="Bachelor of Technic"/>	Branch <input type="button" value="Computer Engineee"/>	<input type="checkbox"/> All	Course Name	Date	Time Slot
Scheme <input type="button" value="B. Tech Computer I"/>	Semester <input type="button" value="Semester 1"/>	Exam Name <input type="button" value="MST"/>	<input type="checkbox"/>	RC123-Cloud Computing	dd-mm-yyyy	3:15 p.m. - 5
			<input type="checkbox"/>	RCel23-Data Mining	dd-mm-yyyy	3:15 p.m. - 5
<input type="button" value="Submit"/> <input type="button" value="Clear"/>						

## Existing Timetable

Timetable Name	Session	Degree	Branch	Semester	Exam Type
odd 2023-24 Sem 1 ESE	odd 2023-24	Bachelor of Technology	Computer Engineering	1	ESE
odd 2023-24 Sem 1 MST	odd 2023-24	Bachelor of Technology	Computer Engineering	1	MST
odd 2023-24 Sem 1 ESE	odd 2023-24	Bachelor of Technology	Information Technology	1	ESE

Figure 13: Exam Timetable Generation

### Seating Arrangement - Allocation

Session *	Degree *	Branch *	Scheme *	Semester *	Exam Type *
odd 2023-24	Bachelor of Technology	Computer Engineering	B. Tech Computer Engine	Semester 1	ESE
Course Name *	Room Name *	Bench Position *	Student type *		
RC123-Cloud Computin	AL004	Left	<input checked="" type="radio"/> Regular <input type="radio"/> Backlog <input type="radio"/> Both		
Exam Date *	Slot time *	Total Selected Students	Room Capacity	Remaining Students	
08-04-2024	10:00 AM - 01:00 PM	25	25	25	
<input style="background-color: #008000; color: white; border-radius: 5px; padding: 5px 10px; margin-right: 10px;" type="button" value="Submit"/> <input style="background-color: red; color: white; border-radius: 5px; padding: 5px 10px;" type="button" value="Clear"/>					
From	To	<input style="background-color: #0070C0; color: white; border-radius: 5px; padding: 5px 10px;" type="button" value="Go"/>			

Figure 14: Seating Arrangement Allocation (Exam room allocation)

### Seating Arrangement - De-allocation

Session *	Degree *	Branch *	Scheme *
Choose session...	Choose Degree...	Choose Branch...	Choose scheme...
Semester *	Exam Type *	Course Name *	Room Name *
Choose Semester...	Choose Exam	Choose Course	Choose Room name
<input style="background-color: #008000; color: white; border-radius: 5px; padding: 5px 10px; margin-right: 10px;" type="button" value="Deallocate"/> <input style="background-color: red; color: white; border-radius: 5px; padding: 5px 10px;" type="button" value="Clear"/> <input style="background-color: #0070C0; color: white; border-radius: 5px; padding: 5px 10px;" type="button" value="Report"/>			

Figure 15: Seating Arrangement De-Allocation (Exam room de-allocation)

### Course Registration Report

Session *	Degree *	Branch *	
Choose session...	Choose Degree...	Choose Branch...	
Scheme *	Semester *	Subject Name *	Subject Type *
Choose scheme...	Choose Semester...	Choose subject name	Choose subject type
<p><b>Report</b></p> <p> <input type="radio"/> Course Registered Student List** <input type="radio"/> Coursewise Student Count** <input type="radio"/> Course Registration List** <input type="radio"/> Course Registration Not Done List**         </p> <p> <input type="radio"/> Non Credit Roll List** <input type="radio"/> Back Log List** <input type="radio"/> Faculty Course Report** <input type="radio"/> Consolidate SPI CPI report**         </p>			
<input style="background-color: #008000; color: white; border-radius: 5px; padding: 5px 10px; margin-right: 10px;" type="button" value="Submit"/> <input style="background-color: red; color: white; border-radius: 5px; padding: 5px 10px;" type="button" value="Clear"/>			

Figure 16: Course Registration Report

### Tabulation Register Report

Session *	Degree *	Branch *
Choose session...	Choose Degree...	Choose Branch...
Scheme *	Semester *	
Choose scheme...	Choose Semester...	
<p><b>Report</b></p> <p> <input type="radio"/> ESE Status Report** <input type="radio"/> Coursewise Grade Report** <input type="radio"/> Student Failed List**         </p> <p> <input type="radio"/> Statistical Report** <input type="radio"/> Question Paper and Attendance Report** <input type="radio"/> Backlog Students Report**         </p> <p> <input type="radio"/> Consolidate SPI CPI report** <input type="radio"/> /         </p>		
<input style="background-color: #008000; color: white; border-radius: 5px; padding: 5px 10px; margin-right: 10px;" type="button" value="Submit"/> <input style="background-color: red; color: white; border-radius: 5px; padding: 5px 10px;" type="button" value="Clear"/>		

Figure 17: Tabulation Report which generate report using different filter as radio button choose

## 3. Faculty Results

**Mark Entry**

Session  
odd 2023-24

### Subjects

Sr. No	course code	course Name
1	RCSM12345	Physics

*Figure 18: Mark Entry: subjects display on basis of session the course allocated to Faculty*

**Set Grades Range**

Session	Course Name
odd 2023-24	RCSM12345 - Physics

Sr.no	Grade	Cutoff	Min Marks	Max Marks
1	AA	90	90	100
2	AB	82	82	89
3	BB	66	66	81
4	BC	54	54	65
5	CC	50	50	53
6	CD	45	45	49
7	DD	35	35	44
8	FF	0	0	34
9	RR	0	0	34

**Save**

*Figure 19: Grade Adjustment: set grade cutoff range to allocate the grade to student*

**VI. CONCLUSION AND FUTURE WORK**

The integration of the examination module within the ERP system at VJTI has improved efficiency and reliability, and end users have appreciated it more. Overall, the shift to a digital system has helped overcome such challenges as waste of paper and mistakes in data entry, among others. The offers like the student management system and the easy techniques for attendance management have helped in the management part, whereas the automated seating plan option has helped in the efficient planning for exams. This shift underlines the necessity of adopting technology to enhance the educational system and acts as a solid example for other institutions that want to adjust changes in the management of examinations.

In the future, VJTI plans to carry out business process reengineering (BPR) regarding business processes to fine-tune and sustain the newly implemented ERP system. Other potential enhancements are the expansion of the module features with mobile elements and the integration of artificial intelligence for more sophisticated data analysis. Work

will also be directed towards enhancing system functionality, enhancing the graphical user interface, and conforming to high levels of security standards to enable operations to be secure and in line with the latest standards. All these ventures will assist VJTI in maintaining its leading position in the field of educational technologies, as well as ensuring that all its users have a positive experience.

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